MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

PAM 0135–ALGEBRA

(Foundation in Information Technology/Foundation in Life Sciences)

13 OCTOBER 2016
2.30 pm – 4.30 pm
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 2 pages excluding the cover page and appendix.
2. Answer **all** questions. The distribution of the marks for each question is given.
3. Write all your answers in the Answer Booklet provided.

Answer all questions.

Question 1 (10 marks)

a) Solve the following equation, $\sqrt{x-1}+\sqrt{2x-1}=\sqrt{3x}$. (4 marks)

b) Solve the inequality $8<\left|-4x+\frac{3}{7}\right|+\frac{5}{7}$. (3 marks)

c) Solve the exponential equation $3e^{2x}-10e^{x}=8$. (3 marks)

Question 2 (10 marks)

a) Sketch the graph of $h(x)=-3-\sqrt{4+x}$. Show complete transformations from the graph $y=\sqrt{x}$. Identify the domain and range of $h(x)$. (4 marks)

b) Given $f(x)=3x^4-7x^3+5x+2$, use synthetic division to find the quotient and the remainder of $\frac{f(x)}{x+5}$. (3 marks)

c) Given $g(x)=\frac{x-7}{x-3}$. Find $g^{-1}(x)$. (3 marks)

Question 3 (10 marks)

a) Use the Binomial Theorem to expand $(2x-5)^5$. (4 marks)

b) Use mathematical induction to prove $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+...+\frac{1}{2^n}=1-\frac{1}{2^n}$ is true for every positive integer n. (6 marks)

Continued...

Question 4 (10 marks)

a) The third term and the seventh term of an arithmetic progression are -2 and 10 respectively. Find the sixth term. (4 marks)

b) Given a geometric series $u_1 + u_2 + u_3 + ...$ such that $u_1 + u_3 = 26$ and $u_3 + u_5 = 650$. Find the possible values of u_4. (4 marks)

c) Find the sum of the infinite geometric sequence: $-\frac{3}{2}, 3, -6, 12, ...$ (2 marks)

Question 5 (10 marks)

a) Solve $\frac{2x^2 - 5x - 12}{x - 2} > 0$. (4 marks)

b) Given $y = 2 + \ln(x + 1)$,

i. determine the domain, x-intercept and y-intercept. (3 marks)

ii. sketch the graph. Show the points and asymptote. (3 marks)

End of Page

APPENDIX

$a^2 - b^2 = (a-b)(a+b)$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)^2 = a^2 + 2ab + b^2$

$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$\log_b b = 1$

$\log_b 1 = 0$

$\log_b (MN) = \log_b M + \log_b N$

$\log_b \left(\frac{M}{N}\right) = \log_b M - \log_b N$

$\log_b M^p = p \log_b M$

$\log_b M = \frac{\log_a M}{\log_a b}$

$a_n = a_1 + (n-1)d$

$S_n = \frac{n}{2}(a_1 + a_n)$

$a_n = a_1 r^{n-1}$

$S_n = \frac{a_1(1-r^n)}{1-r}$

$S = \frac{a_1}{1-r}$, infinite sum $|r| < 1$